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EXAMINER	
KIM, JOHN K	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,555	MADISON, JOEL V.	
	Examiner	Art Unit	
	JOHN K. KIM	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5,7,9,11 and 13-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,7,9,11 and 13-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

RCE

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/27/2009 has been entered.

2. In view of amendments, the Examiner withdraws the rejection under 35 USC 103(a) to claims 1,3,5,7,9,11 and 13-18. However, claims 1,3,5,7,9,11 and 13-18 are not in a condition for allowance in view of new ground of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 5, 9, 13, 15 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For claim 3, "temperature range of the cryogenic liquid turbine generator" and "condition for operative" are indefinite. Therefore, the comparison is indefinite. For purpose of examination, the examiner regards the temperature range of the cryogenic

liquid turbine generator is 180 degrees C and condition for operative is less than 1% of linear expansion.

For claims 5, 9, 13, 15 and 17, the claims refers 'the spacer', which is indefinite since said 'the spacer' has not been defined in respective parent claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1,3,5,7,9,11 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (applicant admitted prior art) in view of Nakamura (US 6433457) and in further view of Brown et al (US 6261455).

As for claim 1, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having main product-lubricated bearings separated by a span of shaft and a thrust equalizing mechanism adjacent one of said main bearings, the lubricated bearings having bearing blocks, the thrust mechanism comprising a thrust plate, variable orifice and fluid chamber, the fluid chamber fluidically coupled to the variable orifice (preamble of Jepson type claim is considered as an admitted prior art), *except* an improvement comprising a stationary spacer composed of material that shrinks less than the shaft of the generator interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to reduce the span between said main bearings.

In the same field of endeavor, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and a stationary spacer (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and the bearing blocks (41) of its adjacent main bearing to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Nakamura with that of AAPA to have a spacer interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to be tightly supported by the frame. Nakamura however is silent to show or disclose a stationary spacer composed of material that shrinks less than the shaft of the generator.

In the same field of endeavor, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less

than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have a spacer composed of material that shrinks less than the shaft of the generator interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to reduce the span between said main bearings (intended use), since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 3, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim 1 above. References are silent to show or disclose the height of the spacer is selected such that it is operative over the temperature range of the cryogenic liquid turbine generator. However, since spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.engineeringtoolbox.com/linear-thermal-expansion-d_1379.html), it would

have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 5, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having product-lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings and a variable orifice defined between the thrust plate and a throttle plate affixed to the shaft (preamble of Jepson type claim is considered an admitted prior art), *except* an improvement comprising *(1)* a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and a stationary length compensator (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of

ordinary skill in the art at the time the invention was made to have a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary length compensator (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the generator, since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 7, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim 5 above. References are silent

to show or disclose the height of the thrust plate and the length compensator are selected such that it is operative over the temperature range of the cryogenic liquid turbine generator. However, since plate and spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.engineeringtoolbox.com/linear-thermal-expansion-d_1379.html), it would have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 9, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having product-lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings (preamble of Jepson type claim is considered an admitted prior art), *except* an improvement comprising *(1)* stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and stationary means (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary means (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the generator, since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for

predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 11, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim 5 above. References are silent to show or disclose the height of said means is selected according to desired thrust equalizing mechanism such that they operative over the temperature range of the cryogenic liquid turbine generator. However, since plate and spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.engineeringtoolbox.com/linear-thermal-expansion-d_1379.html), it would have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 13, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having main product-lubricated bearings separated by a span of shaft and a thrust equalizing mechanism adjacent one of said main bearings (preamble of Jepson type claim is considered an admitted prior art), *except* an improvement comprising *(1)* a stationary spacer interposed between the thrust equalizing mechanism

and its adjacent main bearing to reduce the span between said main bearings, (2) wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a stationary spacer (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary spacer interposed between the thrust equalizing mechanism and its adjacent main bearing to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in admitted prior art, since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel

since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 14, except claim dependency, the claim contains the substantially same limitation as claim 3 and is rejected for the same reason set forth in connection with the rejection of claim 3 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same.

As for claim 15, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having product- lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings and a variable orifice defined between the thrust plate and a throttle plate affixed to the shaft (preamble of Jepson type claim is considered an admitted prior art), *except (1)* an improvement comprising a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a stationary length compensator (col, 2, line 1-6) interposed between the thrust plate (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate

in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in admitted prior art, since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 16, except claim dependency, the claim contains the substantially same limitation as claim 7 and is rejected for the same reason set forth in connection

with the rejection of claim 7 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same.

As for claim 17, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having product- lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings (preamble of Jepson type claim is considered an admitted prior art), *except (1)* an improvement comprising stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses stationary means (col, 2, line 1-6) interposed between the thrust plate (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in admitted prior art, since expansion coefficient of steel is less that that of stainless steel (see coefficient of linear thermal expansion α of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient_of_thermal_expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 18, except claim dependency, the claim contains the substantially same limitation as claim 11 and is rejected for the same reason set forth in connection with the rejection of claim 11 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN K. KIM whose telephone number is (571)270-5072. The fax phone number for the examiner where this application or proceeding is assigned is 571-270-6072. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen Leung can be reached on 571-272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Supervisory Patent Examiner, Art Unit 2834

JK